JIDC | THE JOURNAL OF INFECTION IN DEVELOPING COUNTRIES

Coronavirus Pandemic

Evidence of community pharmacists' response preparedness during COVID-19 public health crisis: A cross-sectional study

Hager ElGeed[1], Yaw Owusu[1], Sara Abdulrhim[1], Ahmed Awaisu[1], Vyas S Kattezhathu[2], Palli Valapila Abdulrouf[3], Sowndramalingam Sankaralingam[1]

[1] Clinical Pharmacy and Practice Department, College of Pharmacy, QU Health, Qatar University, Doha, Qatar
[2] Wellcare Pharmacy, Doha, Qatar, Doha, Qatar
[3] Women Wellness and Research Center, Hamad Medical Corporation, Doha, Qatar

Abstract

Introduction: Community pharmacists are often the first point of contact for the public, especially during pandemics. As outlined by the International Pharmaceutical Federation, community pharmacists have an important public health role during this Coronavirus Disease 2019 (COVID-19) public health emergency. We therefore investigated the current practices, response preparedness and professional development needs of community pharmacists in Qatar.

Methodology: A descriptive cross-sectional online 38-item questionnaire-based survey constructed on evidence-based public health roles of pharmacists was conducted between 28 May and 18 June 2020. Questions related to current practices required responses on a 5-point Likert-type scale ranging from "always" to "never". The questionnaire was evaluated for validity and the reliability analysis showed a Cronbach's alpha coefficient of 0.921.

Results: The response (n = 311) rate for the survey was 34.2%. More than 75% of pharmacists "always" encouraged and practiced hygiene and social distancing measures. On the other hand, the proportion of pharmacists "always" involved in patient assessment, education or providing information related to COVID-19 and application of evidence-based protocol ranged from 32 to 73%. The vast majority (87-96%) of pharmacists indicated that they needed professional development related to COVID-19. Overall, 77% of pharmacists either "strongly agreed" or "agreed" that they have all the necessary COVID-19 related emergency response preparedness and training. Country from which pharmacists obtained their first degree, and the type of pharmacy where they practice influenced their overall perception toward emergency response preparedness.

Conclusions: Community pharmacists in Qatar are willing to receive additional training related to COVID-19 public health crisis despite being prepared to engage with patients.

Key words: Community pharmacist; COVID-19; emergency response preparedness; professional development.

J Infect Dev Ctries 2021; 15(1):40-50. doi:10.3855/jidc.13847

(Received 07 September 2020 – Accepted 08 December 2020)

Introduction

Ever since the first reports of a cluster of cases of pneumonia caused by SARS-CoV-2 (or simply, the coronavirus) was reported in December of 2019 in Wuhan, China, which was later named as Coronavirus Disease 2019 (COVID-19), almost 66.7 million people have been infected resulting in approximately 1.53 million deaths worldwide [1,2]. The COVID-19 was declared a Public Health Emergency of International Concern (PHEIC) by the World Health Organization (WHO) on 30 January 2020 and was characterized as a pandemic on 11 March 2020 [1]. The person-to-person spread of the virus appears to commonly occur *via* respiratory droplets among close contacts (within 1.8 meters) when an infected individual sneezes or coughs [3]. The virus may also spread when an individual comes in contact with contaminated surfaces. Importantly, even asymptomatic individuals may also spread the virus and recovered individuals may continue to remain contagious for up to two weeks after the resolution of symptoms [4-6]. These characteristics of the disease warrant early detection and prevention, to minimize community transmission. Fever, cough, myalgia, and shortness of breath are some of the most common symptoms of the disease that can be assessed through a brief medical history and examination of vital signs [7].

The healthcare system, including healthcare professionals, has been overwhelmed due to patients infected with COVID-19 [8,9]. In addition, quarantine of infected or exposed healthcare workers themselves has resulted in a shortage of healthcare professionals globally, including the state of Qatar [10,11]. Given this unprecedented circumstance, community pharmacists,

who are often the first point of contact with the public could play an extended role in screening, educating, and helping the community during this public health crisis. This is especially important due to rapid rise and resurgence of CVOID-19 cases [12-15].

During such public health crises, pharmacies serve as frontline healthcare facilities [16]. Pharmacists have performed several tasks and played a significant role during natural and manmade disasters such as the 11 September 2001 World Trade Center attack, Hurricane Katrina, Thunderstorm Asthma event, the Severe Acute Respiratory Syndrome (SARS), and the H1N1 influenza pandemic to assist their respective communities [17-21]. Therefore, community pharmacists, in particular, could contribute significantly to public health roles of health promotion and disease prevention during disease outbreaks and pandemics [22]. Using the Delphi technique, several roles pharmacists could play in prevention, preparedness, response, and recovery during disasters, in general, have been defined [23]. Furthermore, the International Pharmaceutical Federation (FIP) has identified several roles and responsibilities the community pharmacists can perform during this public health crisis to keep the community safe [6]. Importantly, community pharmacists can play a role in disease prevention by practicing, educating, and recommending preventive measures such as hand hygiene, safe distancing, and the use of masks or barriers. Furthermore, they can educate patients or customers on the use of hand sanitizers or hand-washing and appropriate medications that can help with their symptoms and maintain adequate and consistent supply of the same. They can also coordinate care with other healthcare agencies or governments through referrals.

In Qatar, the first case of COVID-19 was diagnosed on 29 February 2020. On 17 March 2020, there were 442 cases when the Qatar government had ordered the closure of several businesses and institutions with certain exceptions such as community pharmacies and essential food stores [24]. Since then, more than 139,400 cases have been recorded. This places the community pharmacists in a unique position to serve the community during this public health crisis. After extensive literature search, it was noted that no studies in Qatar and other Gulf Corporation Council (GCC) countries have investigated the current practices and emergency preparedness of community pharmacists during COVID-19 pandemic and what their professional development needs are in relation to providing continued care to affected individuals or those at risk. The aim of this study is to evaluate 1) the current practices and preparedness to respond to the COVID-19 emergency, and 2) the professional development needs of community pharmacists in Qatar.

Methodology

Study Design and Setting

This was a descriptive cross-sectional, online questionnaire-based study conducted between 28 May and 18 June 2020. The study targeted all currently practicing community pharmacists licensed in the State of Qatar. The manuscript has been prepared in accordance with the STROBE statement [25].

Study Population

The study population included all licensed pharmacists currently practicing in community pharmacies in Qatar (n = 995). To ensure adequate representativeness of the study sample, community pharmacists practicing in Qatar under the three major chains in the country (i.e. Wellcare, Kulud, and Care n Cure companies) and independent pharmacies were approached. The database of all licensed/registered community pharmacists practicing in the country was utilized for the determination of the sampling frame for this study.

Sample Size and Sampling

Raosoft® online calculator was used for the determination of the required sample size using the following parameters: total number of licensed community pharmacists in Qatar (n = 995), confidence level (95%), alpha level (5%), and sample response distribution (50%). This resulted in a minimum required sample size of 278.

However, due to the predicted low response rate of community pharmacists in Qatar, whole population sampling was used by distributing the survey to all the reachable community pharmacists *via* the available e-mail addresses in the database, as well as through the pharmacy coordinators/managers of each of the pharmacy chains and independent pharmacies.

Survey Development and Validation

The 38-item survey used in this study was developed through a review of available literature pertaining to the public health role of pharmacists in COVID-19 pandemic and based on the pedagogical questions of the investigation [22,26-28]. The questionnaire was developed and administered in English, as it is the language that is understood and most commonly spoken among all community pharmacists

regardless of their nationality. The originally developed questionnaire was qualitatively evaluated for content validity (tests for comprehensiveness, adequacy, redundancy, and clarity of the items) and face validity (tests for time burden, clarity, understanding, and ambiguousness of items) by five pharmacy faculty members with extensive experience in practice-based and public health research and survey instruments development. Other measures of psychometric validity such as criterion and concurrent validity were not undertaken due to the lack of existing gold standard instruments to benchmark against the new instrument. However, the two constructs of the instrument related to practices and professional development needs were directly driven from the internationally recognized public health role of pharmacists as published by key international organizations and scholars. Reliability analysis of current practice related to COVID-19 response preparedness showed a Cronbach's alpha coefficient of 0.921. Five revisions were made to the original survey by the research team through an iterative process to address the issues identified during the validation process and to ensure its appropriateness for the study. For example, the initial survey had less demographic items, while reviewers suggested the addition of country of the first professional degree in pharmacy and type of community pharmacy to allow opportunity for inferential analyses. In addition, instructions were added to each section in the final version to ensure clarity of the questions. Reviewers involved in the validation also suggested changing the response options of the last section (professional development needs of community pharmacists) from Likert-type scale to yes/no style as well as adding an item to assess the overall perception of community pharmacists towards COVID-19 emergency preparedness. The readability, clarity, and completion time of the questionnaire were further determined by piloting the survey among the research team members.

The items in the final online version of the questionnaire were grouped into three: (1) sociodemographic and professional characteristics (6 items); (2) current practices related to COVID-19 emergency response preparedness (20 items); (3) professional development needs related to COVID-19 emergency response preparedness (10 items). One multiple-choice question with a Likert scale of "strongly agree" to "strongly disagree" to assess overall perception towards COVID-19 emergency response preparedness, and a final open-ended free-text question for comments and suggestions were added to the questionnaire. The practice-related section (Section B) included 20 multiple-choice questions with 5 response options on a Likert scale ranging from "always" to "never", while the professional development needs section (Section C) comprised 10 yes or no questions.

Survey Administration and Data Collection

The anonymous online survey was administered to the community pharmacists using SurveyMonkey® online software (SurveyMonkey Inc, San Mateo, California, USA). The survey link was distributed by two members of the research team via personal e-mail to the study population. Moreover, pharmacy managers/coordinators all the pharmacy chains and independent pharmacies were used as focal points to distribute the survey link to their pharmacists via e-mail. The survey was completely anonymous, and no one would be able to link the respondents with their respective responses. The survey URL link was opened from 28 May to 18 June 2020. Three reminders were sent out to participants on a weekly basis during the study period to increase the response rate. The responses received were reviewed after the closure of the online link to the survey and respondents who filled only Section A (sociodemographic and professional characteristics) either completely or partially were excluded from data analyses, because such responses will not add any value to the study. The data were then extracted from SurveyMonkey® to IBM Statistical Package for Social Sciences (IBM SPSS® Statistics for Windows, version 26.0; IBM Corp, Armonk, NY, USA).

Data Analyses

Categorical variables were presented as frequencies and percentages, while descriptive statistics (mean ± standard deviation), and mean ranks were calculated for continuous variables (specifically, the overall perception score). Mann-Whitney U and Kruskal Wallis tests were applied to analyze statistical differences in the overall perception towards COVID-19 emergency response preparedness (defined as the median value of the one-item score) between groups. All inferential tests were two-tailed with the significance level (α) set at $p < 0.05$. All data were analyzed using SPSS version 26. The qualitative data generated from the open-ended question were analyzed using content analysis to identify key issues raised by the community pharmacists surveyed. The most commonly identified issues were categorized and supported with relevant quotes examples. The figure was generated using GraphPad Prism®.

Ethical Considerations

The study protocol, informed consent form, and the questionnaire were reviewed and approved by the Qatar University Institutional Review Board (QU-IRB) (approval number QU-IRB 1313-E/20). The privacy and confidentiality of the study participants were protected at all times throughout the study. Personalized e-mail invitations instead of mass-e-mail invitations were sent to potential participants so that the identity of the invitees was not exposed. Furthermore, the survey was anonymous and participation was voluntary. The data collected would not be shared with anyone outside the research team and would be deleted after a certain predetermined period as per QU-IRB regulations.

Results

Demographic and Professional Characteristics of Community Pharmacists in Qatar

All registered community pharmacists in Qatar (n = 995) were invited to participate in the study through a database maintained in the investigators' institution. A total of 340 responses were received (response rate 34.2%). Of this, we included 311 responses in the analysis by excluding respondents who filled only the demographic and professional characteristics section wholly or in part (useable rate = 91.5%).

Table 1 represents the demographic and professional characteristics of the respondents included in the analysis. Around 66% of the respondents were males and 79.1% were Bachelor's degree holders. Most of the respondents (60.5%) obtained their first professional degree in pharmacy from India, followed by Egypt (19.3%). Since their graduation, most of the participants (62.4%) have practiced pharmacy for more than 5 years.. When being asked about their duration of practice in Qatar, the majority (68.8%) indicated that they have practiced pharmacy in Qatar for less than 5 years. More than 88% of the respondents worked at chain pharmacies, while only 11.3% worked at independent community pharmacies.

Table 1. Demographic and Professional Characteristics of Community Pharmacists in Qatar (n = 311).

Characteristic	n (%)
Gender	
Male	206 (66.2)
Female	105 (33.8)
Highest degree in pharmacy	
Bachelor's degree	246 (79.1)
Others	65 (20.9)
Country of first professional degree in pharmacy	
Egypt	60 (19.3)
India	188 (60.5)
Others	63 (20.3)
Years of practice since graduation	
Less than 5 years	117 (37.6)
More than5 years	194 (62.4)
Years of practice in Qatar	
Less than 5 years	214 (68.8)
More than 5 years	79 (31.2)
Type of community pharmacy	
Independent pharmacy	35 (11.3)
Chain pharmacy	276 (88.7)

Current Practices of Community Pharmacists Related to COVID-19 Emergency Preparedness in Qatar

Table 2 presents the extent of current practices related to COVID-19 emergency response and preparedness as expressed by the community pharmacists surveyed in Qatar. Most of the community pharmacists indicated that they "always" sell facemasks (83.3%) and hand gloves (75.2%) to customers/patients. Similarly, the majority of the respondents indicated that they "always" encourage their customers and patients to use hand sanitizers (83.3%) and to properly wash hands using soap and water (78.5%). Moreover, less than 80% of the respondents indicated that they "always" encourage patients and customers to wear masks and gloves (79.1%) and educate them about their proper use (73.6%). However, about 5.8% admitted that they had "never" encouraged customers not wearing masks or hand gloves to do so.

Most pharmacists (77.2%) indicated "always" when they were asked about how often they disinfect their work area and surfaces. On the other hand, fewer participants (58.2%) indicated that they "always" gather medical and medication history from their patients to be able to assess their general health status and 11.6% reported that they sometimes do so. In addition, 62.4% of the community pharmacists reported that they "always" read educational material related to the prevention of the spread of COVID-19 from reliable sources, while 64% of them "always" provide education to their customers and patients, who have multiple disease states, to take extra precautions. Only 61% of the respondents reported that they were "always" able to identify personnel who could be at high risk of respiratory infections at their workplace. Approximately 92% of the pharmacists indicated that they "very often" to "always" provide customers and patients with information on the role or evidence regarding the use of products like vitamin C for the prevention of COVID-19 infection (Table 2).

Only 42.8% of the surveyed community pharmacists in Qatar reported that they "always" encounter customers and patients who are concerned about being in direct contact with people who are in isolation or quarantine due to COVID-19 infection, and only 62.4% of them "always" provide proper education on social distancing and home isolation when they encounter a patient with symptoms of upper respiratory tract infection. Additionally, only around half (52.4%) reported that they "always" apply an evidence-based protocol to deal with patients who present with symptoms related to COVID-19 infection. Around 12% of the respondents "rarely" to "never" advise or refer suspected cases of COVID-19 to call the COVID-19 HOTLINE (16000) for the appropriate action based on their symptomatology and history related to COVID-19

Table 2. Current Practices of Community Pharmacists Related to COVID-19 Emergency Preparedness (n = 311).

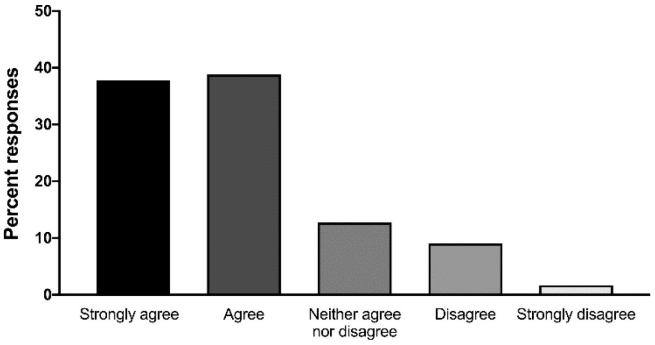
Practice item	Responses, n (%)					Median (IQR)
	Always	*Very Often*	*Sometimes*	*Rarely*	*Never*	
Sell face masks to customers/patients	259 (83.3)	35 (11.3)	8 (2.6)	2 (0.6)	7 (2.3)	4 (0)
Sell gloves to customers/patients	234 (75.2)	56 (18.0)	11 (3.5)	3 (1.0)	7 (2.3)	4 (0)
Encourage customers/patients to use hand sanitizer	259 (83.3)	32 (10.3)	12 (3.9)	6 (1.9)	2 (0.6)	4 (0)
Encourage customers/patients to properly wash their hands using soap and water	244 (78.5)	36 (11.6)	21 (6.8)	8 (2.6)	2 (0.6)	4 (0)
Encourage customers/patients who are not wearing masks/gloves to do so	246 (79.1)	27 (8.7)	14 (4.5)	6 (1.9)	18 (5.8)	4 (0)
Educate customers/patients about the proper way to use gloves, masks, or sanitizers	229 (73.6)	49 (1.8)	24 (7.7)	8 (2.6)	1 (0.3)	4 (1)
Keep the recommended distance (>1.5 meters) between you and your customers/patients	258 (83.0)	33 (10.6)	12 (3.9)	6 (1.9)	2 (0.6)	4 (0)
Keep the recommended distance (>1.5 meters) between you and your customers/patients	246 (79.1)	38 (12.2)	19 (6.1)	7 (2.3)	1 (0.3)	4 (0)
Disinfect the work area like counter, touch screens, telephone handset, keyboard etc.	240 (77.2)	53 (17.0)	10 (3.2)	6 (1.9)	2 (0.6)	4 (0)
Gather medical/medication history from customers and assess their general health	181 (58.2)	85 (27.3)	36 (11.6)	6 (1.9)	3 (1.0)	4 (1)
Read any educational material regarding the prevention of the spread of COVID-19 from reliable sources (e.g. Ministry of Public Health, Hamad Medical Corporation, American Society of Health-Systems Pharmacists, etc.)	194 (62.4)	79 (25.4)	37 (11.9)	1 (0.3)	0 (0)	4 (1)
Educate customers/patients with multiple disease states, based on their medical history, to take extra precautions (e.g. staying home and social distancing)	199 (64.0)	78 (25.1)	26 (8.4)	8 (2.6)	0 (0)	4 (1)
Identify personnel who could be at high risk of respiratory infections at your workplace (e.g. cleaners, pharmacy technicians, accountants, etc.)	190 (61.1)	59 (19.0)	25 (8.0)	17 (5.5)	20 (6.4)	4 (1)
Receive questions from customers/patients about the symptoms of COVID-19 infection	196 (63.0)	66 (21.2)	39 (12.5)	9 (2.9)	1 (0.3)	4 (1)
Provide customers/patients with information on the role or evidence regarding the use of products like vitamin C for the prevention of COVID-19 infection	229 (73.6)	57 (18.3)	19 (6.1)	5 (1.6)	1 (0.3)	4 (1)
Encounter customers/patients, who are concerned about being in direct contact with people who are in isolation or quarantine due to COVID-19 infection	133 (42.8)	71 (22.8)	59 (19.0)	30 (9.6)	18 (5.8)	3 (2)
Provide proper education on social distancing and home isolation when you encountered a patient with symptoms of upper respiratory tract infection	194 (62.4)	66 (21.2)	36 (11.6)	12 (3.9)	3 (1.0)	4 (1)
Apply an evidence-based protocol to deal with patients who present with symptoms related to COVID-19 infection	163 (52.4)	78 (25.1)	38 (12.2)	17 (5.5)	15 (4.8)	4 (1)
Advise suspected cases to call the COVID-19 HOTLINE (16000) for the appropriate action based on their symptoms/history related to COVID-19 infection	181 (58.2)	60 (19.3)	34 (10.9)	15 (4.8)	21 (6.8)	4 (1)
Provide evidence-based information for customers/patients or other healthcare providers regarding the use of some medications for COVID-19 (e.g. hydroxychloroquine, azithromycin, etc.)	101 (32.5)	56 (18.0)	73 (23.5)	42 (13.5)	39 (12.5)	3 (3)

infection. Finally, only nearly one-third of the surveyed community pharmacists in Qatar reported that they "always" provide evidence-based information to customers and patients or other healthcare providers regarding the use of some medications for COVID-19 (e.g. hydroxychloroquine, azithromycin, etc). Table 2 provides more information regarding the current practices of community pharmacists in Qatar related to COVID-19 emergency preparedness.

Professional Development Needs of Qatar Community Pharmacists Related to COVID-19 Emergency Response Preparedness

Table 3 illustrates the details on the professional development needs of Qatar community pharmacists related to COVID-19 emergency response preparedness. The vast majority (87 – 96%) of the pharmacists in this study indicated that they need some training in the areas identified by the survey. For instance, more than 95% of the pharmacists indicated that they need training on the standards of public health roles of community pharmacists during natural disasters or pandemics such as COVID-19, treatment and management strategies for COVID-19 infection, and how to access educational resources for the prevention and treatment of COVID-19 infection. In addition, 92.1% of the respondents showed interest in receiving training on how to protect themselves from getting the infection from the workplace. Adherence to emergency protocols and guidelines following possible exposure to an infected person was also an area of training that was indicated by 94.4% of the community pharmacists. Similarly, 92.8% of the respondents expressed interest in receiving training on history taking and interviewing strategies related to COVID-19 infection that can help in screening patients. Relatively lesser proportions of the community pharmacists indicated training needs for evaluating research literature related to COVID-19 pandemic 87.2%) and on how to disinfect workplace areas and surfaces (87.5%).

Figure 1. Overall perception of community pharmacists' COVID-19 emergency response preparedness.



The figure represents the community pharmacists' (n = 299) extent of agreement to the following statement: "I have all the necessary emergency response preparation and training required to face the COVID-19 pandemic" on a 5-point scale. The bars represent the percent of pharmacists indicating a certain level of agreement.

Overall Perception of COVID-19 Emergency Response Preparedness

The participants were asked to indicate the extent of their agreement/disagreement with the following statement: "I have all the necessary emergency response preparation and training required to face the COVID-19 pandemic". Responses ranged from "strongly agree" and "agree" (37.8% and 38.8% respectively) to "disagree" and "strongly disagree" (9.0% and 1.7% respectively). Refer to Figure 1 for more details.

Influence of Qatar Community Pharmacists' Characteristics on the Overall Perception towards COVID-19 Emergency Response Preparedness

Overall, most demographic and professional characteristics of the respondents did not influence their overall perception towards their emergency response

Table 3. Professional Development Needs of Community Pharmacists Related to COVID-19 Emergency Response Preparedness (n = 305).

Training need item	Response, n (%)	
	Yes	No
Standard public health roles of community pharmacists during natural disaster or pandemics such as COVID-19 pandemic	291 (95.4)	14 (4.6)
Protecting yourself from getting the infection from the workplace	281 (92.1)	24 (7.9)
Treatment and management strategies for COVID-19 infection	293 (96.1)	12 (3.9)
Accessing educational resources for the prevention and treatment of COVID-19 infection	291 (95.4)	14 (4.6)
Following emergency protocols and guidelines following possible exposure to an infected person	288 (94.4)	17 (5.6)
Responding to drug information requests from customers/patients using an evidence-based approach	282 (92.5)	23 (7.5)
Responding to drug information requests from healthcare providers using evidence-based resources	287 (94.1)	18 (5.9)
Evaluating research literature related to COVID-19 pandemic	266 (87.2)	39 (12.8)
Disinfecting workplace and surfaces	267 (87.5)	38 (12.5)
History taking and interviewing strategies related to COVID-19 infection that can help in screening patients	283 (92.8)	22 (7.2)

preparedness to face the COVID-19 pandemic. However, the country of obtaining the first professional degree in pharmacy and the type of pharmacy currently practicing significantly influenced the pharmacists' perceptions with P-values of 0.005 and 0.008, respectively. Community pharmacists who graduated from the Philippines and India tended to have higher positive perception than others (p-value = 0.005). Similarly, those who practiced in chain pharmacy had significantly higher scores in terms of their perception towards their emergency response preparedness and professional development related to the COVID-19 pandemic (4.08 ± 0.97 vs. 3.53 ± 1.21; p-value = 0.008). Table 4 illustrates the details of the influence of Qatar community pharmacists' characteristics on their overall perception towards COVID-19 emergency response preparedness.

Qualitative Comments from Participants related to Emergency Response Preparedness in Community Pharmacy in Qatar

Overall, 18 participants expressed that the efforts of the government and the Ministry of Public Health (MOPH) enhanced their preparedness towards COVID-19. Despite that, some participants (n = 17) believed that they would benefit from professional development courses regarding COVID-19 as they receive conflicting news and statistics from social media. Selected quotes related to the issues identified by the participants are presented below:

"The Qatar government is doing a great job in handling the pandemic. It helps us frontlines in the field of community pharmacy deal the pandemic easier by setting rules, guidelines and educating the public on the proper handling of the pandemic"

"There are many conflicting information regarding the virus and the proper way of dealing with it. There should be a continuously updated source accessible to all health care providers informing them, interacting with them and evaluating them"

Fourteen community pharmacists expressed their need for stronger efforts to protect their health as they are the frontline in this crisis. They demanded a continuous supply of personal protective equipment (PPE) and mandating their use. Moreover, participants suggested other protective methods such as glass-partition or window placement within the pharmacy setting (n = 6), fumigation and disinfection of the environment (n = 7), reduction of working hours and days per week (n = 3), and reduction of the number of working pharmacists per shift (n = 2) to limit and reduce the exposure to patients, especially those who are asymptomatic. To avoid possible infections, 13 pharmacists emphasized on the importance of regular and random COVID-19 testing for patients and community pharmacists and the importance of using the COVID contact-tracing application EHTERAZ. Unfortunately, pharmacists indicated a lack of a focal

Table 4. Influence of Qatar Community Pharmacists' Characteristics on Overall Perception towards COVID-19 Emergency Response Preparedness.

Variable	Mean ± SD	Mean Rank	P-value*
Gender¥			
Male	4.10 ± 0.95	155.3	0.120
Female	3.87 ± 1.10	139.92	
Highest Degree in Pharmacy			
Bachelor's degree	4.06 ± 0.96	152.3	0.334
Others	4.02 ± 0.01	141.03	
Country of first professional degree in pharmacy			
Egypt	3.82 ± 1.10	134.34	
India	4·17 ± 0·94	162.57	0.005
Others	3.77 ± 1.05	128.73	
Years of practice since graduation			
Less than 5 years	4.13 ± 0.99	159.48	0.124
More than 5 years	3.96 ± 1.02	144.48	
Years of practice in Qatar			
Less than 5 years	4.04 ± 0.9	151.52	0.633
More than 5 years	3.97 ± 1.06	146.69	
Type of community pharmacy¥			
Independent pharmacy	3.53 ± 1.21	115.35	0.008
Chain pharmacy	4.08 ± 0.97	154.45	

P-value was calculated using *Kruskal-Wallis test and ¥Mann-Whitney U test.

point assignment for reporting positive staff cases. Below are examples of quotes from the participants related to the issues discussed above:

"PPE Kit should be made mandatory for all health professionals dealing with customers either in chain, independent, or hospital pharmacies. Distribution of some safety disinfectant like gloves mask and sanitizer should be initiated by the government for the needful labor especially in the industrial area"

"It is better for most of the community pharmacies to make a glass partition between the pharmacist and the customer so that the best methods of protection are stronger"

"The pharmacist should be more protected and that is through lowering exposer hours and exposer days to the risk of catching the virus, as of the number of staff in pharmacy and working hours and days".

Discussion

This study represents the first in Qatar to explore community pharmacists' response preparedness during COVID-19 public health crisis in Qatar. Overall, a large proportion (77%) of the community pharmacists in Qatar believed that they possess all the necessary emergency response preparedness and training to face the COVID-19 pandemic. The majority of the community pharmacists reported practicing most of the best practices that are expected of them to fulfill their public health role during a pandemic, including, but not limited to, educating customers/patients on properly using prevention strategies such as hand hygiene and wearing surgical masks. Conversely, lesser proportions of the community pharmacists "always" conduct health and medication history-taking, read credible educational material related to preventative measures for COVID-19, educate their customers and patients who have multiple comorbidities, provide education on social distancing and home isolation, apply an evidence-based protocol to deal with symptomatic patients, and provide evidence-based information to customers/patients or other healthcare providers regarding the use of some medications such as hydroxychloroquine and azithromycin. The pharmacists indicated training and professional development needs in diverse areas such as public health roles of community pharmacists during natural disasters and pandemics, treatment and management strategies for COVID-19 infection, self-protection against being infected from the workplace, and history-taking and interviewing related to COVID-19 infection for screening patients.

Recent guidelines and studies have identified that community pharmacists can contribute to the prevention, preparedness, and response during the ongoing COVID-19 public health crisis [6,22]. The present study is comprehensive in that it explored the current practices of community pharmacists on the following themes: 1) prevention of COVID-19; 2) patient assessment; 3) patient education and; 4) evidence-based practice. The WHO recommends the use of face masks, gloves, hand hygiene, and social distancing as measures to prevent the spread of COVID-19 which are endorsed by the FIP [6]. The majority of community pharmacists surveyed in Qatar responded as "always" that they sell face masks, gloves and encourage patients/customers to maintain hand-hygiene and social distancing thus playing an important role in prevention and transmission of COVID-19. As indicated in another recent study, it is possible that the pharmacists were provided training on the use of PPE by their organizations [29]. This practice is in alignment with other studies where community pharmacists have been shown to possess the knowledge regarding the transmission of COVID-19 and methods of prevention, and that PPE availability would allow them to perform their duties [16,29,30]. Consistent with these studies, community pharmacists in the current study also stated that contact avoidance measures such as PPE and use of barriers for interaction with patients/customers should be made available.

More than half (around 60%) of pharmacists did not "always" gather medical history or identify patients at high risk, which is concerning since symptoms of COVID-19 can be identified through brief history taking and measurement of temperature. This could be attributed to limited scope of practice of pharmacists that commonly includes dispensing prescription and non-prescription medications and recommending medications for minor ailments. Therefore, the community pharmacists may be avoiding physical assessment of patients. Another theme to which pharmacists were less enthusiastic in responding was patient and pharmacist education. A study that analyzed the roles of pharmacists during the SARS outbreak and the FIP identified providing drug information is a vital role [6, 20]. However, the current study has shown that pharmacists were less enthusiastic about providing evidence-based drug information and COVID-19 management strategies. Only about 60% of pharmacists were "always" involved in educating high-risk patients on social distancing and home isolation. Moreover,

pharmacists were less interested in providing medication-related evidence-based information, and applying evidence-based protocols to deal with symptomatic patients which requires pharmacists to review latest evidence-based scientific literature. This could be attributed to the lack of time or the stress of working over-time due to the shortage of pharmacy workforce [31]. These results are important for the investigators to emphasize education as part of pharmacy practice. The results of the current study are consistent with another study where intervention provided by pharmacy students served as effective education resources for patients during the H1N1 pandemic [21]. One previous study from Qatar also reported substandard patient counseling by community pharmacists [32]. On the other hand, two recent studies conducted during this COVID-19 pandemic that explored pharmacy practice, did not address the role of pharmacists in patient education [29,30]. One of the accepted roles of pharmacists is to direct or refer patients for further investigation and care [22]. However, pharmacists from the current study were less involved in advising suspected cases to call the COVID-19 HOTLINE in Qatar. This could be related to lesser identification of suspected cases as a lower proportion of pharmacists reported performing patient assessment.

The study further explored the professional development needs of community pharmacists to manage practice during COVID-19. An overwhelming majority of pharmacists expressed additional needs in training in several areas such as medical history taking, prevention, management strategies, following emergency protocols, and responding to drug-information requests. This is consistent with the qualitative comments that pharmacists require continuously updated sources of information regarding COVID-19. Given that the spread of COVID-19 is unabated, provision of training as part of continuing professional development could be explored further given that community pharmacists have expressed interest in a previous study [33]. Education and updated information for pharmacists were crucial. However, a lesser proportion of pharmacists answered "yes" to obtaining training in evaluating scientific literature on COVID-19. This could be due to a lack of interest in education or time [31]. It could also be due to lack of live continuing professional development sessions on COVID-19. This also reflects on the lower proportion of pharmacists involved in patient education. A lower proportion of pharmacists also responded to training needs in the area of disinfecting workplaces and surfaces. It is possible that the pharmacists were already provided training by their employer. This is also evident from the statements made by pharmacists suggesting various measures to keep their workplace free from virus contamination.

Importantly, the study explored what characteristics of pharmacists influenced their current practice and response preparedness. The findings of the current study suggest that pharmacists who work in chain pharmacies had better overall perception of their role and preparedness toward the pandemic than those who work in independent pharmacies. This may be because chain pharmacies have disaster preparedness or contingency plans which independent pharmacies may be unable to invest in.

There are several points to consider when interpreting the study findings. First, the response rate among community pharmacists was low, as seen in other studies involving community pharmacists in Qatar, despite the regular reminders and adequate time [34-36]. This could have been due to the lack of time, absence of pharmacy staff, or being quarantined. However, the low response rate did not affect the robustness of the results as the minimum calculated sample size was reached. Second, this study did not explore pharmacists'role in medication management or supply chain maintenance and logistics as these are routine tasks that pharmacists regularly perform during any time period. Future studies can focus on the qualitative exploration of the areas that community pharmacists feel they need professional development and training on to face emergencies and public crises such as the COVID-19 pandemic. Finally, the non-parametric tests that were used in inferential analyses are less powerful in identifying significant statistical associations as compared to parametric tests. However, this can be accepted considering the nature of this observational study.

This study provides baseline information on the current preparedness of community pharmacists to manage the COVID-19 pandemic. Based on the results of this study, we believe that we need to integrate the services provided by community pharmacies with the overall services that are provided by other health care facilities in order to fill the gaps in practice. In addition, we recommend that community pharmacists should receive the required training and professional development that can optimize provision of services to the community, as well as preventing themselves from the risk of the infection from workplace.

Conclusions

The results of the study suggest that community pharmacists in Qatar are well-prepared to engage with patients/customers during the COVID-19 pandemic. Given the importance of prevention of community transmission, the majority of pharmacists "always" practice hygiene-related tasks. However, they could improve on patient assessment and education. Despite a reasonable level of preparedness, the pharmacists are willing to receive additional training to manage COVID-19. Finally, there is a need and opportunity for pharmacists to play a key role to improve patient care in Qatar especially during a public health crisis such as the COVID-19 pandemic.

Acknowledgements

The study investigators thank the pharmacists for completing the online survey.

Authors' contributions

HG: Conceptualization, data curation, formal analysis, investigation, methodology, project administration, writing – original draft. YO: Conceptualization, investigation, methodology, supervision, validation, writing – review and editing. SA: Conceptualization, data curation, formal analysis, investigation, methodology, project administration, writing – original draft. AA: Conceptualization, formal analysis, investigation, methodology, supervision, validation, writing – review and editing. VSK: Conceptualization, investigation, project administration, writing – review and editing. PVA: Conceptualization, investigation, project administration, writing – review and editing. SS: Conceptualization, methodology, investigation, resources, formal analysis, visualization, supervision, project administration, writing – original draft and review and editing.

References

1. World Health Organization (WHO) (2020) WHO timeline - COVID-19. Available: https://www.who.int/news-room/detail/27-04-2020-who-timeline---covid-19. Accessed: 25 June 2020.
2. Worldometer (2020) COVID-19 Coronavirus Pandemic. Available: https://www.worldometers.info/coronavirus/. Accessed: 05 December 2020.
3. Meselson M (2020) Droplets and aerosols in the transmission of SARS-CoV-2. N Eng J Med 382: 2063.
4. Rothe C, Schunk M, Sothmann P, Bretzel G, Froeschl G, Wallrauch C, Zimmer T, Thiel V, Janke C, Guggemos W, Seilmaier M, Drosten C, Vollmar P, Zwirglmaier K, Zange S, Wolfel R, Hoelscher M (2020) Transmission of 2019-nCoV infection from an asymptomatic contact in Germany. N Eng J Med 382: 970-971.
5. Bai Y, Yao L, Wei T, Tian F, Jin DY, Chen L, Wang M (2020) Presumed asymptomatic carrier transmission of COVID-19. JAMA 323: 1406-1407.
6. International Pharmaceutical Federation (FIP) (2020) COVID-19: Guidelines for pharmacists and the pharmacy workforce. Available: https://www.fip.org/files/content/priority-areas/coronavirus/COVID-19-Guidelines-for-pharmacists-and-the-pharmacy-workforce.pdf. Accessed: 01 May 2020.
7. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, Zhang L, Fan G, Xu J, Gu X, Cheng Z, Yu T, Xia J, Wei Y, Wu W, Xie X, Yin W, Li H, Liu M, Xiao Y, Gao H, Guo L, Xie J, Wang G, Jiang R, Gao Z, Jin Q, Wang J, Cao B (2020) Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. Lancet 395: 497-506.
8. Warner MA (2020) Stop doing needless things! Saving healthcare resources during COVID-19 and beyond. J Gen Intern Med 35: 2186-2188.
9. Ripp J, Peccoralo L, Charney D (2020) Attending to the emotional well-being of the health care workforce in a New York City health system during the COVID-19 pandemic. Acad Med 95: 1136-1139.
10. Gomez-Duran EL, Martin-Fumado C, Forero CG (2020) Psychological impact of quarantine on healthcare workers. Occup Environ Med 77: 666-674.
11. Nagesh S, Chakraborty S (2020) Saving the frontline health workforce amidst the COVID-19 crisis: Challenges and recommendations. J Glob Health 10: 010345.
12. Bell J, Dziekan G, Pollack C, Mahachai V (2016) Self-care in the twenty first century: A vital role for the pharmacist. Adv Ther 33: 1691-1703.
13. Goode JV, Owen J, Page A, Gatewood S (2019) Community-based pharmacy practice innovation and the role of the community-based pharmacist practitioner in the United States. Pharmacy 7: 106.
14. European Centre for Disease Prevention and Control (2020) Rapid risk assessment: resurgence of reported cases of COVID 19 in the EU/EEA, the UK and EU candidate and potential candidate countries. Available: https://www.ecdc.europa.eu/en/publications-data/rapid-risk-assessment-resurgence-reported-cases-covid-19. Accessed: 2 July 2020.
15. Paul R, Arif AA, Adeyemi O, Ghosh S, Han D (2020) Progression of COVID-19 from urban to rural areas in the United States: A spatiotemporal analysis of prevalence rates. J Rural Health 36: 591-601.
16. Austin Z, Martin JC, Gregory PA (2007) Pharmacy practice in times of civil crisis: The experience of SARS and the blackout in Ontario, Canada. Res Social Adm Pharm 3: 320-335.
17. Ford H, von Waldner T, Perri M 3rd (2014) Pharmacists' roles in post-September 11th disasters: A content analysis of pharmacy literature. J Pharm Pract 27: 350-357.
18. Traynor K (2007) Pharmacy, public health intersect in Alabama disaster plans. Am J Health Syst Pharm 64: 1998-1999.
19. Inspector-General for Emergency Management (IGEM) Victorian Government (2017) Review of response to the thunderstorm asthma event of 21-22 November 2016 - Final report. Available: https://www.igem.vic.gov.au/reports-and-publications/igem-reports/review-of-response-to-the-thunderstorm-asthma-event-of-21-0. Accessed: 30 June 2020.
20. Chin TW, Chant C, Tanzini R, Wells J (2004) Severe acute respiratory syndrome (SARS): the pharmacist's role. Pharmacotherapy 24: 705-712.

21. Miller S, Patel N, Vadala T, Abrons J, Cerulli J (2012) Defining the pharmacist role in the pandemic outbreak of novel H1N1 influenza. J Am Pharm Assoc 52: 763-767.
22. Cadogan CA, Hughes CM (2021) On the frontline against COVID-19: Community pharmacists' contribution during a public health crisis. Res Social Adm Pharm 17: 2032-2035.
23. Watson KE, Singleton JA, Tippett V, Nissen LM (2019) Defining pharmacists' roles in disasters: A Delphi study. PloS one 14: e0227132.
24. Government Communications Office - State of Qatar (2020) Government communications office statement regarding measures taken by the State of Qatar to combat coronavirus (COVID-19). Available: https://www.gco.gov.qa/en/. Accessed: 26 April 2020.
25. Enhancing the quality and transparency of health research (2020) The Strengthening the Report of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. Available: https://www.equator-network.org/reporting-guidelines/strobe/. Accessed: 15 July 2020.
26. Al-Quteimat OM, Amer AM (2021) SARS-CoV-2 outbreak: How can pharmacists help? Res Social Adm Pharm 17: 480-482.
27. American Society of Health-System Pharmacists (2020) ASHP COVID-19 resources center: Sample list of potential pharmacy public health roles at the local or state levels. Available: https://www.ashp.org/COVID-19/Sample-List. Accessed: 14 June 2020.
28. American Society of Health-System Pharmacists (2020) ASHP COVID-19 pandemic assessment tool for health-system pharmacy departments. Available: https://www.ashp.org/-/media/assets/pharmacy-practice/resource-centers/Coronavirus/docs/ASHP_COVID19_AssessmentTool.ashx?la=en&hash=D4222461335FCEAB8DE30F996388232700B9543F. Accessed: 14 June 2020.
29. Meghana A, Aparna Y, Chandra SM, Sanjeev S (2021) Emergency preparedness and response (EP and R) by pharmacy professionals in India: Lessons from the COVID-19 pandemic and the way forward. Res Social Adm Pharm 17: 2018-2022.
30. Basheti IA, Nassar R, Barakat M, Alqudah R, Abufarha R, Mukattash TL, Saini B Pharmacists' readiness to deal with the coronavirus pandemic: Assessing awareness and perception of roles. Res Social Adm Pharm. In press.
31. Awaisu A, Alsalimy N (2015) Pharmacists' involvement in and attitudes toward pharmacy practice research: A systematic review of the literature. Res Social Adm Pharm 11: 725-748.
32. Paravattil B, Kheir N, Yousif A (2017) Utilization of simulated patients to assess diabetes and asthma counseling practices among community pharmacists in Qatar. Int J Clin Pharm 39: 759-768.
33. Al-Sulaiti F, Fares H, Awaisu A, Kheir N Continuing professional development needs of community pharmacists in Qatar: A mixed-methods approach. Int Q Community Health Educ. In press.
34. Awaisu A, Kheir N, Ibrahim MI, El-Hajj M, Hazi H, Khudair N, Barazi R (2014) Knowledge, attitudes, and practices of community pharmacists on generic medicines in Qatar. Int J Clin Pharm 36: 394-404.
35. Ibrahim MI, Palaian S, Al-Sulaiti F, El-Shami S (2016) Evaluating community pharmacy practice in Qatar using simulated patient method:acute gastroenteritis management. Pharm Pract 14: 800.
36. Paravattil B, El Sakrmy N, Shaar S (2018) Assessing the evidence based medicine educational needs of community pharmacy preceptors within an experiential program in Qatar. Curr Pharm Teach Learn 10: 47-53.

Corresponding author

Sowndramalingam Sankaralingam, MBBS, MSc, PhD
Assistant Professor, Department of Clinical Pharmacy and Practice
College of Pharmacy, QU Health
Building I 06, Room S A2.06,
Qatar University, P.O. Box 2713, Doha, Qatar.
Tel: (+974) 4403 5618
Fax: (+974) 4403 5551
Email: sownd@qu.edu.qa

Conflict of interests: No conflict of interests is declared.